B.C. Hydro

Homathko Development

PROSPECTUS

GENERATION ONLY

Generation Planning Department
System Engineering Division
December 1982

Report No. SE 8222

For further information about the proposed Homathko Development please contact the Community Relations Department, B.C. Hydro, 970 Burrard Street, Vancouver, B.C. V6Z 1Y3, or telephone (collect) 663-4344.

B.C. HYDRO

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HOMATHKO DEVELOPMENT
PROSPECTUS

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SUMMARY

The Homathko River rises on the western edge of the Chilcotin Plateau and flows in a southwesterly course from Tatlayoko Lake through the Coast Mountains to its mouth at the north end of Bute Inlet.

B.C. Hydro's engineering overview studies identified two alternative development schemes for the Homathko River. One, involving diversion of water from the Taseko watershed, a tributary of the Fraser, into the Homathko basin to augment the flows of the Homathko is no longer being studied. The scheme recommended for further investigation would produce 900 MW and consists of an upstream storage project, two downstream power projects on the Homathko River, and a combined power and storage project on the main tributary, Mosley Creek. No diversions would be involved in the latter scheme.

Engineering and environmental studies would have to continue for up to 4 years before sufficient information could be available to seek regulatory approval for the Homathko Development. The earliest date that power could be produced from the Homathko Development would be late 1995. The Homathko Development is not, however, included in B.C. Hydro's System Plan at this time.

This prospectus provides a brief description of the generation facilities of the Homathko Development. A separate prospectus will be prepared for the transmission studies.

The major environmental concern with the generation facilities would be the impact of partial regulation of the lower Homathko River on salmonid populations and their habitats. Impacts from transmission have not yet been defined.

SECTION 1.0 - INTRODUCTION

B.C. Hydro is studying possible hydroelectric development of the Homathko River, located about 270 km northwest of Vancouver. Engineering and environmental overview studies completed in early 1982 concluded, on the basis of preliminary data, that hydroelectric development of the Homathko River would merit further study. Studies to establish the engineering and environmental feasibility of the project were authorized by B.C. Hydro's Board of Directors in April 1982.

This report has been prepared to initiate provincial government review of the Homathko Development. Review of this prospectus by concerned provincial review ministries will help ensure that the project planning studies will be able to meet the requirements of the Utilities Commission Act and other statutes, should B.C. Hydro decide to seek regulatory approval to develop the Homathko River. It is expected that this report also will later be made available to the public and will be given wide distribution as part of the public consultation program.

Information contained in this report is tentative, as it is based on preliminary office investigations, and very limited field work. Full information on project layouts, costs and environmental impacts will not be available until more detailed studies have been completed.

SECTION 2.0 - PROJECT DESCRIPTION

2.1 PROJECT AREA

The development area, shown on Fig. 1, lies in the Coast Mountains north of Bute Inlet and is approximately 270 air km northwest of Vancouver.

The Homathko River rises on the western edge of the Chilcotin Plateau and flows south to Tatlayoko Lake. The river then follows a general southwesterly course through extremely rugged Coast Range Mountains to its mouth at Bute Inlet. The Homathko drainage basin is considerably varied in its physical features from the semi-arid region near Tatlayoko Lake to the wet, heavily timbered coastal valley of the lower portion of the river.

In its course from Tatlayoko Lake through the Coast Range to the head of Bute Inlet, the Homathko River drops 823 m in 130 km. The steepest section of the river is between Tatlayoko Lake and Waddington Canyon, a narrow rock gorge with almost vertical walls, situated about 50 km upstream from the river's mouth.

Mosley Creek is the principal tributary of the Homathko River. From its source in Bluff Lake, Mosley Creek flows southward in a broad flat-bottomed valley which is on average 800 m wide, with steep-walled sides rising 1200 to 1800 m to the mountain tops. The valley appears to be well suited for a reservoir, and also provides a favourable location for a damsite near its lower end. At this point, Mosley Creek becomes a swift-flowing, turbulent river in a rocky canyon which extends for the next 13 km of its course to its confluence with the Homathko River, where Tiedemann Creek, flowing from the Tiedemann Glacier, also joins the main Homathko River.

Below Waddington Canyon, the river gradient lessens and the valley widens again. In its course to the head of Bute Inlet the river meanders along the valley bottom, and is joined by three large tributaries.

Tatlayoko Lake, near the head of the Homathko River at El. 827 m, lies in a trench 27 km long on the edge of the Chilcotin Plateau, parallel to and approximately 16 km west of Chilko Lake. Tatlayoko Lake serves as a natural reservoir for the upper Homathko watershed.

The Homathko River area is a remote and isolated part of British Columbia. The eastern approach to the area is by the Chilcotin Highway, a gravel highway extending from Williams Lake west to Bella Coola. Tatla Lake is roughly midway, about 240 km west of Williams Lake. A logging and farm-access road runs from Tatla Lake to Twist Lake in the upper Mosley Valley, and a forestry road extends along the eastern shore of Tatlayoko Lake in the Homathko Valley. The western approach is by sea to the head of Bute Inlet and by forestry roads through the lower section of the Homathko River Valley to Waddington Canyon. There is no road access beyond this point. Nearly 80 km of the Homathko and Mosley valleys are presently inaccessible, except by helicopter.

2.2 DEVELOPMENT SCHEME

The development scheme shown on Fig. 2 was investigated in the overview studies. Information provided below on the projects is based on very preliminary studies and will be subject to change as more detailed investigations are carried out.

The development scheme, which will be the focus of the next stage of engineering studies, consists of four projects having a generating capacity of 900 MW and producing 4800 GW.h of energy annually.

The Tatlayoko Storage Project would be located at the outlet of Tatlayoko Lake and would raise the level of the lake a maximum of 9 m, with a drawdown range of 10 m. The project would comprise a main earthfill dam about 26 m high and 850 m long, a small saddle dam about 9 m high and 150 m long across Ottarasko Creek, and a canal diverting Ottarasko Creek into the reservoir.

Access to the site would require upgrading and realignment of the existing road located on the east side of the lake.

The Nude Canyon Project would be built in a V-shaped gorge about 2 km downstream from the confluence of Nude Creek and the Homathko River. The dam would be 200 m in height. The reservoir would be confined in a narrow canyon of the Homathko River with a short reach up the Nude Creek valley, and would have a drawdown of about 1.5 m. A power tunnel, extending 7 km downstream from the dam, would lead to the powerhouse, which would be located at the confluence of Mosley Creek and Homathko River, and which would house the power facilities of both the Nude Canyon and Mosley Creek projects. The generating capacity of the Nude Canyon powerhouse would be 240 MW.

Access to the powerhouse from the Waddington Canyon Project would require construction of 8 km of high level road west of the Homathko River, plus a 3 km long tunnel. Access to the Nude Canyon Project from the powerhouse would require construction of 3 km of road, plus a 5 km long tunnel.

The Mosley Creek Project would be located on Mosley Creek about 13 km upstream of its confluence with the Homathko River. The project would consist of a 140 m high dam, and an 11 km long power tunnel, leading to the same powerhouse that would use flow from the Nude Canyon dam. The generating capacity of the Mosley Creek powerhouse would be 300 MW.

Access to Mosley Creek damsite would require construction of 14 km of road from the Mosley/Nude powerhouse site and possibly 45 km of road from Middle Lake along and above the banks of the reservoir created by the Mosley Creek Project.

The reservoir would extend up the Mosley Creek valley to between Twist and Middle Lake, and would be drawn down 30 m to regulate river flows.

The Waddington Canyon Project would be located about 800 m upstream of the confluence of Klattasine Creek and the Homathko River, near the downstream end of Waddington Canyon. The dam would be of concrete arch construction and 200 m in height. Power facilities would be located in an underground powerhouse within the left abutment, with a generating capacity of 360 MW. The reservoir would extend up the Waddington Canyon to the confluence of the Homathko River and Mosley Creek, and would have a drawdown of 1.5 m.

Access to the damsite would require construction of 8 km of new road along the right bank of the river from the end of an existing logging road originating at Bute Inlet, and 3 km of tunnel. Access to the powerhouse would require a 360 m long tunnel and about 1.5 km of road connecting it to the main right bank road via a new bridge across the Homathko River.

2.3 PLANNING AND CONSTRUCTION SCHEDULE

As shown on Fig. 3, the earliest possible date that power could be produced from the Homathko Development is 1995. This estimate allows 4 years to complete the studies necessary to support an application for an energy project certificate, 2 years for regulatory review and approval, and 6 years to construct the first project, Mosley Creek.

No commitment has been made to follow this schedule, however, and B.C. Hydro's only current plans for the Homathko Development are to carry out feasibility studies.

B.C. Hydro conducts its engineering and environmental studies for potential major projects in three general steps: overview, feasibility and preliminary design. These study stages are described in detail in Section 6.1.

The feasibility stage of the Homathko Development studies began in the spring of 1982, and is expected to continue for 3 years. If the results of the feasibility studies are favourable, the program may proceed into the preliminary design stage, which would continue for another 3 years. B.C. Hydro would have sufficient information to support an application for an energy project certificate once the first stage of preliminary design studies were completed.

If an application for an energy project certificate is made, it is estimated that it would take 2 years before B.C. Hydro could receive permission to begin construction, if such permission were to be given.

For scheduling purposes it has been assumed that the Mosley Creek Project would come into service first, followed by the Tatlayoko Storage Project in conjunction with the Waddington Canyon Project. The Nude Canyon Project would be the last element to be developed.

SECTION 3.0 - PROJECT RATIONALE

The Homathko Development is being studied because it may prove to be an attractive alternative to other generation sources which could be constructed to meet energy requirements after the mid-1990s.

In selecting projects to meet future energy needs, B.C. Hydro schedules the lowest unit energy cost sources first, provided they can be developed in time to meet expected future energy demand. The sequence of plant additions which is reviewed and adjusted annually, is known as the "System Plan".

The number of feasible alternative power projects for early development is limited. The earliest feasible in-service dates of alternative major new generation projects that B.C. Hydro is now considering, along with their firm energy capabilities and average unit energy costs are summarized below:

	Project	Earliest Feasible In-service Date	Installed Capacity (MW)	Firm Energy (GW.h)	Unit*1 Energy Cost (mills/kW.h)
Hydro:	Peace Site C	1989	900	4 740	27
	Keenleyside	1990	210	830	31
	Murphy Creek	1990	300	1 710	29
	Stikine-Iskut	1994	2 765	13 160	27
	Homathko	1995	900	4 800	32
	Liard	1998	4 400	23 900	25
Thermal:	East Kootenay	1993	600	3 940	38

*1 Preliminary estimate of long-term average unit energy cost including transmission, taxes, and water rental fees. Calculated using October 1982 project cost estimates.

The Peace Site C and Keenleyside-Murphy projects are among the most economic sources of new electrical supply for the B.C. Hydro system, and they also have the earliest feasible in-service dates of the various large power plants under consideration. The Homathko Development has a longer planning and construction lead time remaining and could not be developed before the mid 1990s. For this reason the Homathko Development cannot be considered as an alternative to the Peace Site C or Keenleyside-Murphy projects planned for the late 1980s and early 1990s.

B.C. Hydro's current System Plan relies on the Stikine-Iskut Development in northern B.C. to serve increases in electrical energy demands during the middle to late 1990s. If the Stikine-Iskut Development were to be delayed or could not be licensed, or if the rate of load growth were to fall, the Homathko projects could be scheduled ahead of the Stikine-Iskut projects. The Homathko Development could also follow the Stikine-Iskut Development, in which case it would probably not be completed until after the year 2000.

Other major generation sources which could be in-service by the mid-1990s include the coal-fired East Kootenay thermal project and the Liard River hydroelectric development. Based on preliminary investigations, the Homathko Development has a lower unit energy cost than the thermal project, but a higher unit energy cost than the Liard and Stikine-Iskut developments. One important advantage that the Homathko Development has in relation to the Liard and Stikine-Iskut developments, however, is that it can provide smaller increments of power, which might reflect actual load growth requirements more closely.

SECTION 4.0 - PROJECT REVIEW PROCESS

Before B.C. Hydro could construct any of the projects included in the Homathko Development, an energy project certificate would have to be obtained from the provincial government under the provisions of the Utilities Commission Act. This legislation provides for the review and certification of all energy projects, such as electric power plants which generate 20 MW or more, and transmission lines of 500 kV voltage or higher.

If B.C. Hydro were to decide to seek regulatory approval for construction of the Homathko Development, it is anticipated that the initial application would be for construction of all of the projects included in the preferred development scheme, as opposed to a separate application being submitted for each of these projects. It is also anticipated that any 500 kV transmission lines required to connect the generation projects to the provincial grid would be included in the same application.

As the Homathko Development studies continue, B.C. Hydro will follow the "pre-application phase" of the provincial energy project review process. This process, which is described in the Guide to the Energy Project Review Process (Province of B.C., January 1982), provides for ongoing consultation between the proponent of a project and government agencies during early project planning, and ensures that government permit and approval requirements are identified and addressed prior to making an application.

Two reports are submitted as part of the pre-application phase. The Homathko Development Prospectus is the first of these reports, and initiates provincial review of the Homathko Development studies. The second report, referred to as a "preliminary planning report", would be

prepared if the study program were to advance into the preliminary design study stage. This report would provide a preliminary environmental and socio-economic impact assessment and detailed terms of reference for further studies, plus a preliminary procurement plan, a description of the public consultation program, and a preliminary list of approvals, licences and permits required for the development.

A separate prospectus and preliminary planning report will be prepared for the Homathko transmission studies at the appropriate stages of the study process, as discussed in Section 6.5.

SECTION 5.0 - ISSUES AND CONSTRAINTS

This section provides a summary of the major potential issues and constraints on the generation facilities of the Homathko Development. Information provided below is based on preliminary overview studies and must be considered tentative.

1. Environmental - The major environmental impacts of the generation facilities centre on changes to the hydrology of the river system downstream of the Waddington Canyon damsite. Alterations in suspended sediments, temperature, and seasonal fluctuation of flow rates could have significant effects on the estimated 81 000 salmon migrating and spawning in the lower Homathko River, but preliminary assessments indicate that these effects could be largely mitigated.

   Exploration and construction activities could disturb wildlife in the area, including moose, goat, sheep and bear populations.

2. Socio-Economic - The exploration and construction phases would create some local employment and would provide general economic stimulation to the region.

   Most of the social impacts would be concentrated in the Tatla Lake - Tatlayoko Lake area. Flooding, increased access, noise during construction, and a general increase in human activity would affect people living in the area. The reservoirs of the Mosley Creek Project and the Tatlayoko Storage Project would flood agricultural and homestead lands which are currently in use and also may affect some trapping areas, grazing lands, guiding territories and mineral claims.

Improved access to the development area would increase its use for for hunting, fishing and other recreational pursuits. The Mt. Waddington area is of national significance as a recreational climbing area.

SECTION 6.0 - PROPOSED STUDIES

6.1 B.C. HYDRO'S PLANNING PROCESS

Studies of potential hydroelectric developments normally proceed through a series of progressively more detailed investigations. This procedure is followed to ensure that a project is technically and economically acceptable at a specific knowledge level before proceeding to more detailed, and more costly, level of studies.

B.C. Hydro conducts its engineering and environmental studies for potential major projects in three general stages.

(a) Overview

Overview studies determine in very general terms whether potential for an economically attractive energy development exists and how it could be developed. These studies culminate in the preparation of an overview report, which recommends whether further, more detailed studies should be undertaken. Overview studies identify major issues which might affect a project's acceptability as well as reporting generally on the engineering and environmental aspects.

(b) Feasibility

If further studies are warranted, the second stage is to investigate the engineering and environmental feasibility of the project. A site exploration program is initiated at this stage, along with preliminary environmental studies and a public consultation program. Contact with government agencies is also established. Environmental and socio-economic impacts are assessed

along with economic and engineering factors in arriving at a determination of project feasibility.

During the feasiblity stage, crews may undertake exploratory drilling, site surveys, or other related activities. This does not mean that any commitment to the project has been made.

(c) Preliminary Design

If the results of the feasibility studies are favourable, Hydro may decide to do detailed environmental and preliminary engineering design studies. In this stage the objective is to gather sufficient information to meet requirements for project licencing, including preparation of an environmental impact statement and a benefit/cost analysis.

6.2 ENGINEERING

The Homathko overview study was completed in early 1982. It is presently anticipated that the feasibility study would be completed in early 1985 followed by a preliminary design study for each project. Preliminary design studies would be completed in 1988. This schedule will be subject to change.

The engineering feasibility studies include a program of field exploration to investigate foundation conditions at the various dam and powerhouse sites and to locate sources of construction materials. Office studies will refine the arrangement of structures, generating capacities and energy production, maximum and minimum reservoir levels and estimates of capital cost.

An extensive hydrological program will involve collation of data from streamflow and climatological stations and will enable more reliable

estimation of power flows. A glacialogical study of the Homathko basin has begun.

The emphasis in the geotechnical field investigation program will be on foundation drilling and seismic refraction surveys to determine depth to bedrock and characteristics of overburden and bedrock at the project sites. Additional geological reconnaissance mapping and explorations to confirm adequate supplies of construction materials will be required, and detailed topographic mapping will be prepared for the various project sites and reservoir areas.

It is anticipated that an "Annual Outline of Engineering Investigations" will be published by B.C. Hydro each year. This document will describe the proposed field exploration program for the coming year, and will provide government agencies with information to assist in processing exploration permit applications.

Following is a brief summary of the major components of the field exploration program planned over the next several years.

(a) Feasibility

During the feasibility study stage, operations will be mostly helicopter-supported and few new access roads are planned. A camp has been established at the south end of Tatlayoko Lake.

Drilling at each dam site will investigate dam abutments and foundations, and preliminary assessments of construction materials will be carried out. Seismic and gravity surveys will be conducted for the Tatlayoko Storage Project.

Exploratory drilling for the Nude Canyon and Mosley Creek power tunnels may be required during the third year of feasibility studies. An exploratory adit (tunnel) may be required during the

third year of feasibility studies at the Waddington Canyon dam site, and this may be best supported by a camp on the Homathko River just downstream of Waddington Canyon. Access to this camp would be via an existing logging road from the head of Bute Inlet.

(b) Preliminary Design

Field work will be more extensive during the preliminary design stage. Road access may be required to support work at both the Nude Canyon and Mosley Creek dam sites. Exploratory adits and extensive construction materials drilling will be required at both of these sites.

Additional drilling to "prove up" construction material for the Tatlayoko Storage and Waddington Canyon projects will be carried out. Three more adits will be needed at the Waddington Canyon dam site, and drilling to examine bank stability for each of the four reservoirs may be required.

6.3 ENVIRONMENTAL

Studies are currently being undertaken on wildlife, fisheries, vegetation, socio-economic and heritage resources. These studies are of an inventory nature, aimed at providing B.C. Hydro with a more detailed data base upon which to prepare for impact assessment studies. Such studies, taking place over the next 3 years, will lead to a detailed benefit/cost analysis and a mitigation and compensation proposal for the proposed development.

6.4 LAND USE

Contacts and studies have been initiated to identify potential land use conflicts. Contacts have been made with property owners and trappers, guides and grazing permit holders who may be affected by the feasibility studies. The purpose of these contacts is to provide information on the details of the feasibility studies as they may affect particular areas, and to obtain information on improvements and other personal property that Hydro crews should be aware of in the field in order to minimize property damage.

Studies are under way to identify map tenure and resource permit holders who may be affected by the Homathko Development. A land value monitoring program is being developed which will identify local real estate market trends. This information would be useful for land use planning if studies proceed to the preliminary design stage. It is not anticipated that any property needed for development of any project will be acquired until an energy project certificate has been issued.

6.5 TRANSMISSION

Initial studies indicate that two 500 kV circuits would be required to integrate the Homathko Development with the provincial transmission grid. The destination points for these circuits will depend on the timing of the Homathko Development in relation to other potential long-term generation and transmission projects.

Three alternative transmission plans for the Homathko Development are under consideration:

1. two 500 kV circuits to the Campbell River area via the Bute and Knight Inlets;

2. two 500 kV circuits connecting to the mainland transmission grid in the Williams Lake - Clinton area; and

3. one 500 kV circuit to the Campbell River area and one 500 kV circuit to the mainland transmission grid.

Destination points for Homathko transmission will become more refined as revisions are made to B.C. Hydro's system plans over the next several years. Potential transmission corridors have been identified and are currently being studied at the overview stage. Preliminary route engineering and environmental assessment studies of these potential corridors could begin as early as 1983, and would require 2 years to complete. These studies will provide a basis for selection of preferred transmission corridors, which will be the subject of further detailed engineering and environmental studies.

A prospectus on Homathko transmission will be prepared at the beginning of the preliminary corridor assessment studies, and a preliminary planning report will be prepared prior to the beginning of detailed studies of preferred corridors. Sufficient information to support an application for an energy project certificate would be available once the detailed studies are completed.

Because transmission studies are different in nature from generation studies, they require less time to complete, hence the Homathko transmission studies are not as advanced as the Homathko Development generation studies at this time.

SECTION 7.0 - PUBLIC CONSULTATION

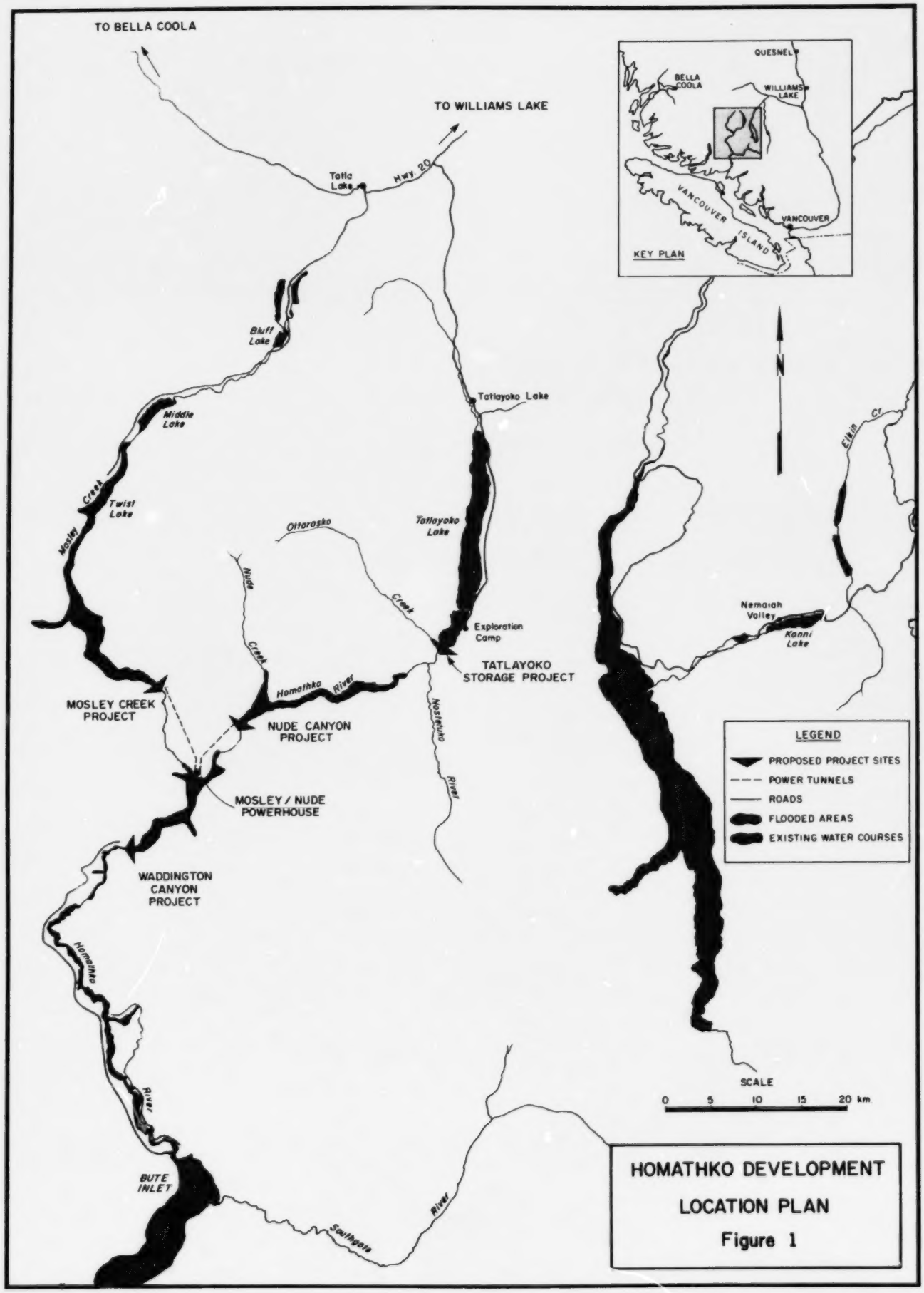
A public consultation program has begun and will continue for the duration of the Homathko Development studies. The objectives of the public consultation program are to:

1. Ensure that the public is kept informed of B.C. Hydro's plans and activities with respect to the Homathko Development.

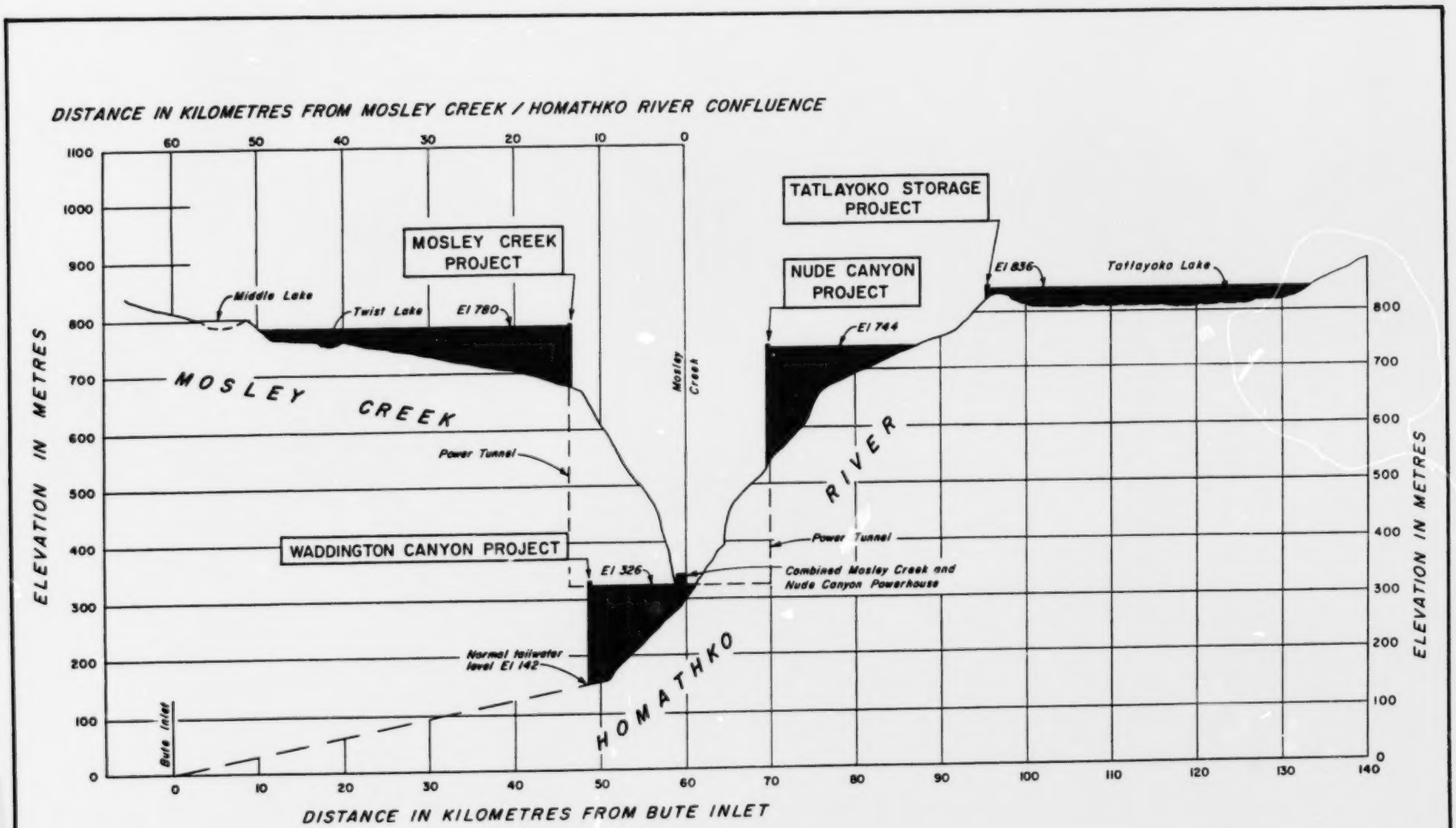
2. Provide opportunities for local government authorities, interest groups and the general public to consult with B.C. Hydro representatives on any matters pertaining to the Homathko Development studies.

3. Assist B.C. Hydro in obtaining the information it needs about public concerns to make informed and responsive decisions.

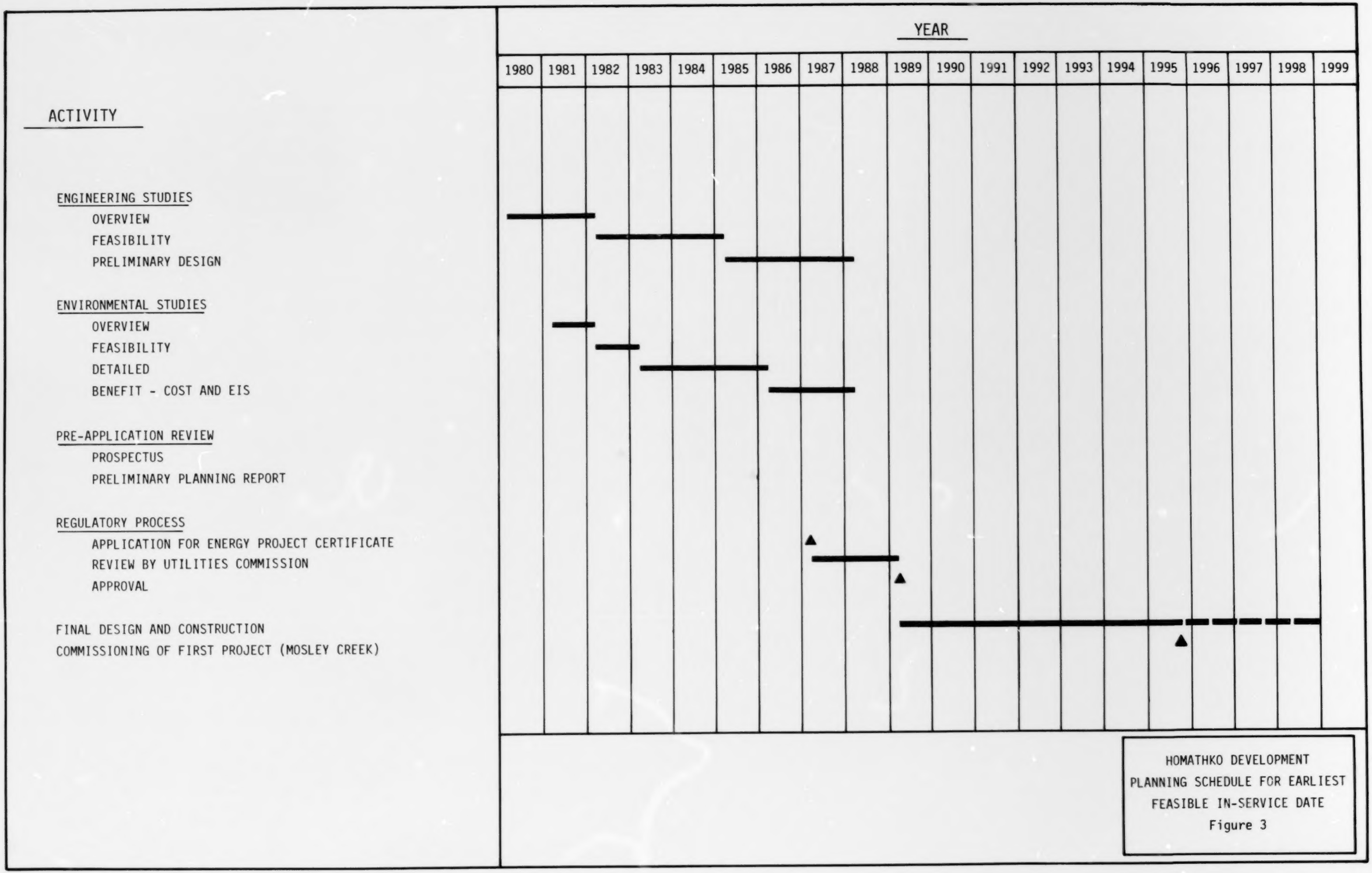
The results of the public consultation program will be documented and included in the supporting materials for any application for an energy project certificate, should B.C. Hydro decide to seek regulatory approval for development of the Homathko River.



HOMATHKO DEVELOPMENT
LOCATION PLAN
Figure 1



HOMATHKO DEVELOPMENT
RIVER PROFILE SHOWING THE
SCHEME OF DEVELOPMENT
Figure 2



HOMATHKO DEVELOPMENT
PLANNING SCHEDULE FOR EARLIEST
FEASIBLE IN-SERVICE DATE
Figure 3